

Cromemco Opens European Subsidiary

It's not unusual for Cromemco employees to hold a friendly get-together with a few friends and industry acquaintances on Friday evenings. What is unusual is to hold such a party in Copenhagen, Denmark.

That is precisely where some Cromemco employees held a party this past October 2nd. And it was a very special occasion, marking the opening of Cromemco A/S, Cromemco's first wholly-owned European subsidiary.

Hosting the celebration were Dr. Roger Melen, Vice President and co-founder of Cromemco, and Lars Anderen, the company's European Support Manager. The guest list included representatives from 15 European dealers and distributors, members of the European press, and officers of Denmark's banking and accounting communities.

Other employees representing Cromemco at the ceremonies were

Mike Ramelot, Director of Finance; Dr. Alice Ahlgren, Director of Communications; and senior Research and Development staffers Curt Terwilliger, Tom McCalmont, and Ed Hall.

Through its direct link with the parent company, Cromemco A/S will provide technical assistance and support to Cromemco's more than 160 dealers and distributors in 15 European countries.

It was because of communication difficulties created by the time differences between Europe and California, and the phenomenal growth in the number of Cromemco users in Europe that a facility of this nature had become a necessity.

The choice of Copenhagen as the site for the first European subsidiary was a direct result of a fact-finding tour taken by Dr. Harry Garland, President of Cromemco, and

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A Technique for Overlaying Program and Data Segments on Cromemco 16K BASIC

By Lou Qing-Zeng

Tianjin, China

Many programs that run on Cromemco 64K Z-80 microcomputers may require more space than the amount of space available. The amount of free memory can be easily determined by typing @ FRE (X). There is usually approximately 30K bytes of space remaining when the buffer is empty. This is the maximum program and data space that can be used using conventional

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Emulating CP/M Under CDOS and CROMIX

By Jency B. Kelly

Have you ever needed to run sophisticated CP/M compatible software such as MILESTONE 8 or CALCSTAR under CDOS and CROMIX only to find that the applications software was incompatible with the operating system? We at Royal Data have had that experience—worse yet, we made commitments to support MILESTONE ver. 1.08 and CALCSTAR under Cromemco's operating systems. Only after committing ourselves did we discover that no commercially available CP/M simulator supported the applications software.

Having stepped into the breach, we found ourselves in an untenable

Continued on page 14

Cromemco's new European subsidiary is located on the world-famous Faadhuspladsen, facing Vesterbrogade, Copenhagen's central thoroughfare.



ENHANCE YOUR CROMEMCO DISK OPERATING SYSTEM WITH USD'S CDOS UTILITIES



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CONTENTS OF USD's CDOS UTILITY DISK

Adir

Displays an alphabetical directory of any CDOS disk, including hard disks. This program is similar to Cromemco's STAT/A, but operates up to TEN TIMES FASTER than STAT/A, especially on the hard disk. Also displays the following useful disk information: disk label, disk date, maximum directory entries, directory entries available, number of files displayed, number of file extents, file Kbyte total, and file Kbytes free. Allows printing a continuous alphabetical archival directory, which cannot be performed with Cromemco's STAT.

CLmap

Displays a cluster map of any CDOS disk, including hard disks. May be used to identify the contents of any disk cluster, or to display the cluster map of any disk file, showing the file's clusters relative to the total disk cluster map. Ambiguous file references are allowed. Identifies all directory entries, including extended (normally transparent) directory entries on hard disks. Useful for re-packing a disk for fastest operation of often-used programs.

Comline

Programmer's aid in interpreting the CDOS command line. Displays all information at default FCB-1 and FCB-2, and command line buffer. If you are programming in assembly language for CDOS or the Cromix CDOS simulator, you should not be without this program. There is never any question as to how the command line will be interpreted: what you see is what you get.

Dstat

A very fast routine to display disk status information for any CDOS diskette, or CDOS hard disk. Operates up to TEN TIMES FASTER than Cromemco's STAT or STAT/B. Displays the following information: disk FORMAT label, disk directory label, disk date, directory entries left, directory entries used, maximum disk directory entries, file space left, file space used, file space used for hard disk extended directory, and maximum disk file space. This utility is normally supplied with USD's SuperCopy I.

DT

Displays and/or sets CDOS date and time. The time function requires a hardware real time clock, such as that built into the Cromemco 3102 terminal, or any other hardware clock, with appropriate I/O software. This program is much faster than Cromemco's STAT/DT for setting and/or displaying CDOS date and time.

DumpRCD

Provides an ASCII/Hex dump of CDOS file records. Similar to Cromemco's DUMP, with the following additional enhancements: display record-at-a-time or continuous ascending display; start dump at any desired file record or address; choice of new starting record or address may be made without reloading program.

Edir

Similar to Adir, but displays only ERASED entries. This utility is normally supplied with USD's RESTORE.

Eject

Remotely eject any one diskette, or all diskettes in Cromemco's 8 inch (PerSci, Inc.) drives.

*All programs require a Cromemco computer operating under CDOS 2.36 or higher.

Pdt

CDOS I/O printer driver with perpetual calendar, for use with Cromemco's 3703 (Centronics 703) or TI-810 printers. May also be used with any "Centronics compatible" printer capable of responding to an ASCII form feed. This I/O driver will format any desired number of lines on a page and print the page number on the bottom of each page. Prevents printing over page perforations on continuous form paper. When used with a hardware clock, such as in the Cromemco 3102 terminal, may be used to print the day of the week, date, and time. Pdt.Com is an executable program which, when used in conjunction with Sdt.Com, may be used to select instantly between a parallel printer and a serial printer.

RAW

Turns CDOS Read-After-Write on or off. Turning RAW off can more than double the effective read/write speed of Cromemco's floppy diskettes. A viable method for increasing the speed of ASCII editors and word processors. If you want to exceed the speed of CP/M systems, but retain the advantages of Cromemco's CDOS, this program is for you.

Read

Allows rapid examination and string search of large ASCII files. Designed to be used with the Cromemco 3102 terminal, operating under CDOS. Read.Com provides forward and backward scrolling, continuous, line-at-a-time, or page-at-a-time viewing, and rapid movement forward and backward thru a file. Provides choice of ten different scroll speeds. May also be used to print an entire file, or just one screenful at a time. In the search mode, this program can locate a desired string in a 100 Kbyte file in less than five seconds! Useful applications: rapid search and examination of large ASCII data base files (e.g. telephone directories, employee data records, etc.); rapid search and examination of large ASCII source files for any programming language. Read.Com provides all of the ASCII file search and examination flexibility of a sophisticated editor or word processor but at up to 50 times the speed, with the additional advantage of small command file size (6 Kbytes), and the ability to print all or selected portions of a file. Most users of Read.Com rarely use the CDOS "TYPE" command.

Replace

Provides rapid, trouble-free search and replace of any desired ASCII string in any CDOS file. Useful for customizing or changing sign-on messages, version numbers, etc.

Sdt

Similar to Pdt, but for use with serial daisy-wheel printers such as the Diablo 1600 or Xerox 1700 series, Qume Sprint 5-9 series, or compatible NEC printers. Provides bidirectional, optimized thruput printing when using these printers as CDOS system list (LST: or PRT:) devices. As with Pdt, provides perpetual calendar and system clock printout. Requires UART serial port hardware such as Cromemco's TU-ART, or the serial port on the SCC/d single card computer.

Sector

Displays an ASCII/Hex dump of any physical or logical CDOS disk block or sector.

Speed

Measures the rotational speed of Cromemco's hard disks.

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I/O News

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Richard Kaye
Editor and Publisher

Typography
Dynacomp, El Toro, CA

Printing
Shears Litho, Santa Ana, CA

input...

To the Editor:

You've run many notes about interfacing Shugart Drives to Cromemco systems. When I looked into adding some eight-inch drives to my system, I considered Shugart as well as several others. I also asked myself some questions as to why I wanted to add "foreign" drives.

First, there is more CP/M-based software (albeit much of it junk) for microcomputers than any other software. Second, the medium of exchange of CP/M is preponderantly single-sided, single-density and on an eight-inch diskette. Third, those Cromemco users like myself who utilize the excellent 5¼" drives must either rely on our friendly dealers to transfer such programs (provided a system is available configured with both drive sizes), or an 8" drive must be acquired. I determined to acquire my own, and I did not intend to spend much for what amounts to secondary drives.

In researching the various alternatives, I was lucky enough to run across the Siemens FDD 100-8. It has several advantages over other drives — specifically Shugart — in particular the advantage of incorporating internal counters for providing a signal to reduce WRITE current on tracks 43-76. The older Shugart design I tested did not have this feature. The differentiation between inner and outer tracks tends to equalize signal-to-noise ratios so that there is less chance of disk read errors on those tracks closer to the hub.

An option on the Siemens circuit board (jumper at vertical K pads)

eliminates the need for a separate Headload signal. Both Track 43 and HDLD are controller signals required by most other makes of diskette drives, although add-on kits are sometimes available to eliminate the former.

In addition, the Cromemco 16FDC controller does not bring Track 43 out to connector J3 (it is not used by the PerSci drives), and HDLD is AND-ed with Drive Select. Therefore, no changes are required to the 16FDC in order to interface with the Siemens 100-8 (a major consideration, in my view).

I thought it might help readers (in the event you decide to publish this) if the whole process were described, rather than the piecemeal approach which evolved in respect to Shugart drive interfaces. Thus, the following:

Only two signals need to be redirected and two wires cut in order to accomplish the interfacing, all of which can be done very easily on the 50-lead, flat ribbon cable between J3 on the 16FDC, and J3 on the drive.

Output DS4' on wire 4 needs to be jumpered to Pin 32 on the drive, and DS3' on wire 18 needs to be jumpered to Pin 30 on the drive. In addition, wires 12 and 24 are to be cut. That is all, except for making sure that the jumper at HS is shifted to SS, and the jumper for radial select is in the correct position (DS0, DS1, DS2, and DS3 corresponding to A, B, C, or D).

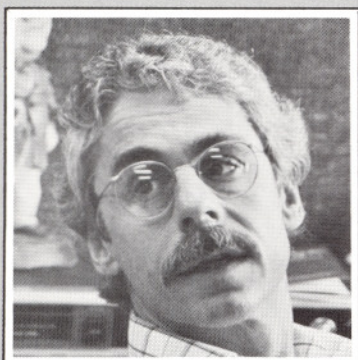
Of course, 120 volts AC must be connected to J1, and +5 volts and +24 volts from the power supply, with common returns, must be connected to J2.

After checking all connections, merely apply power, boot the system, and answer the queries in CDOSGEN with the same answers as for the Shugart 800 (i.e. Single-sided, Single- or Double-density, Slow Speed).

The addition of the 8" drive certainly has facilitated the transfer of programs, as well as providing greater storage capacity on my Cromemco System Two. I hope others can use the information to upgrade their own systems.

M.J. Willner
Santa Ana, California

output



Richard Kaye
Editor and Publisher

New Date for Book

As the old saying goes, "I've got good news, and bad news. Which do you want first?" Okay, first the bad news. The book to which so many members have subscribed, will not be printed until March. Now, for the good news. The delay allows us to include a "Trouble-shooting" guide which Richard Quinn (author of Tec Tips) is currently writing. It **may** also include a listing of UNIX software compiled in 'C' which can be adapted to run under CROMIX. I stress that we **may** be able to include such software. There is a convention on UNIX users in January which we will attend for the sole purpose of obtaining information on such software.

Group Insurance a Reality

The response factor to our initial announcement of the possibility of offering group insurance to members was greeted with enough enthusiasm to ensure that we will be able to take advantage of our mass buying power as an association. We have met with representatives from the insurance companies, and they are preparing forms for those of you who have indicated interest. We will be mailing those forms to you in the next few weeks.

Meanwhile, we will continue to include survey cards with each issue of I/O News. If you have already sent in your card, ignore the ones you receive with your magazine, or better yet, pass the cards on to friends — along with an application to join The IACU. As far as we know, we are the only computer users' group with such a program.

Is Hybrid Equipment Worth the Hassle?

We often get calls or letters asking how to interface certain brands and models of printers, terminals, plotters, modems, drives, and other I/O devices. Sometimes — in fact, quite often — we have been able to refer the member to someone who specializes in exactly the service needed. Several times, though, we

have been unable to find the answers. And, it's no wonder. In a recent conversation with Alan O'Neill, the former Manager of Customer Support at Cromemco, the following facts surfaced:

Printers — There are some 150-200 manufacturers of printers, each with anywhere from 3 to 15 different styles of interface yields. This gives us a low average of 700-800 possibilities — and that many chances for error.

Terminals — There are some 40-150 manufacturers, some making specials for OEMs, and each having some unique characteristic or feature. After all, the terminal industry is very competitive.

Plotters — The same general comments apply to the 20-80 manufacturers in this industry.

Modems — Special controls, cables, software interfaces, etc., apply to the 20-80 suppliers of this peripheral.

Drives — One of biggest problem areas in terms of complexity. For example, Shugart alone makes somewhere between 30 and 70 variations of their own and what they manufacture for OEMs.

Other I/O devices follow the same pattern. Alan would not even get into the subject of software to activate these various devices.

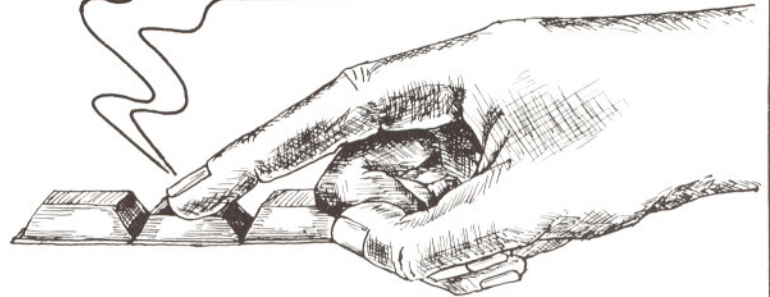
The point is, before you get mad at the folks in Customer Support at Cromemco, or mad at us for not having an answer at our fingertips, consider the possibilities. This may also answer those who accuse us of always recommending Cromemco peripherals (as a matter of fact, we don't). At least with the Cromemco label on a device, we have pretty good assurance that it will interface properly.

By the way, in case you are wondering what has happened to Alan O'Neill since he left Cromemco, he is still deeply involved with microcomputers as a partner in a company which provides sales training in the industry. The company is called Integrated Services Instruction, and is located at 1250 Oakmead Parkway, Suite 210, Sunnyvale, CA 94086. If you would like to call Alan, his phone number is (408) 730-2680.

Richard Kaye
Editor & Publisher

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A Technique for Overlaying Program and Data Seg

techniques. A technique using the BASIC functions LIST, RESTORE, SAVE, and LOAD can produce the effect of segment overlaying to allow almost any size program to run. In many business applications the amount of data is quite large, while the computing task being performed is simple. Thus the technique of running large programs on a microcomputer is useful in many applications. Many programs would not even be possible were it not for the facility of 16K BASIC to accommodate virtually a limitless amount of data and program code. By using the following three simple techniques to implement overlaying the power of a Cromemco microcomputer can be increased to that of a much larger machine.

1. Program Overlays

There are two sets of instructions which are used to achieve program overlaying. LIST and ENTER send and retrieve program code to a file in the format identical to the way it appears on the console screen. ENTER

must be used to retrieve any code sent to a file by LIST. Program code read in by ENTER will replace all the current code with the same line numbers as the code read in. SAVE and LOAD can be used in a similar fashion except that LOAD will clear all the previous code from the buffer before the new code or data is read in. These features of BASIC can be used in almost any program to provide segment overlays. Many programs will have a segment of code that can not be overlayed because that program controls the rest of the program or because the increased execution time the overlaying technique introduces may be undesirable. To avoid deleting a segment of code that must be preserved LIST and ENTER should be used. Often the program can be designed so that the entire program can be overlayed by another segment. In this case the use of the SAVE and LOAD instructions may be useful because they will clear the buffer of all previous program code and data. This achieves the same effect as the SCR or scratch instruction. To write a

program to overlay all of the current segments with a new segment break the program up into several segments, and include the statement RUN "next segment name" in each segment at the place where control should pass to the next segment.

To begin execution of this type of program you only need to type RUN followed by the first segment name. Since the amount of primary storage (RAM) is quite limited one should make full use of BASIC's ability to access secondary storage which is virtually unlimited in comparison. Overlaying techniques can be used at any time to save useful data that may be needed at a later point in the program execution or to clear memory entirely of the current program and data.

2. Changing Disks Under BASIC

The ability to change disks under BASIC increases the available external storage to an almost unlimited amount of data. The correct procedure for doing this is to use the DSK command followed by the at sign or zero (@ or 0). This will log in a new disk and cause drive A to

就CROMEMCO 16K BASIC处理数据的

优势功能。

中国 天津

董庆增

在64K-80微型机上运行CROMEMCO 16K BASIC时内存仅30K(①FRE(X)可测)。简用数据处理的特优点是:数据量大,逻辑关系简单。因此如何在这微型机上运行大程序是任何用户都关心的问题。

然而,对软件设计者的先进技术CROMEMCO 16K BASIC算法上已经为用户提供了利用有限内存处理无限数据的能力。灵活运用下面三条方法就可以把微型机当作大型机用。

1. 关于程序复盖

程序复盖是CROMEMCO 16K BASIC所具有的特性,对于在微型机上运行大程序特别有用。CROMEMCO 16K BASIC关于程序存取有两条指令:LIST, ENTER和SAVE, LOAD。若用LIST把一个程序存入磁盘而用ENTER把该程序调入内存,则内存中原来程序用调入程序具有相同行号的部分将极复盖。利用这极复盖可以对一个

程序进行复盖。若程序段为主程序时则复盖程序段,若数据段为主程序时则复盖数据段,或者两者同时用之。当这极复盖仍不能满足时可应用全程序复盖。若用SAVE把一个程序存入磁盘而用LOAD把该程序调入内存,则内存中原有之内容全部被复盖。也就是说LOAD有SCR的功能。用此可以把一个大程序分成若干个分程序都用SAVE存入磁盘,同时每个分程序中都有一个RUN“下一段程序名”语句,这样只要一个分程序被运行则形成链式反应,自动地下一个把前一个复盖掉。

2. 关于在BASIC状态下更换磁盘

内存是有限的而外存则是无限的,因此充分发挥磁盘的存储作用,随用,随调,随进供合程序复盖就可以处理无限数据。

在DOS状态下,若更换磁盘必须打入CTRL-C键以终止以该内存正在处理的作业,再取碟。而在BASIC状态下,为更换磁盘后打入DSK:0或DSK:@同样也可以登录一个磁盘向量。更换磁盘问题的解决相当于在内存有限而外存无限。

3. 关于存取中间结果

ments on Cromemco 16K BASIC

become the current system default drive. The effect of this is similar to typing CTRL-C while in CDOS.

3. Accessing Results from Computations:

Often each segment's resulting data will have to be written out to disk using PUT or PRINT. This data can later be read back in using GET or INPUT in the final stages of a program to perform the final processing.

(Editor's note: This article is the first we have received from The People's Republic of China, where Cromemco has installed several thousands of computers. It would be difficult to imagine a more enthusiastic group of users anywhere in the world, and we hope this is the start of many more articles. A special thanks for the fine editing done by Chuck Hickey of the R & D Department at Cromemco.)

*For Art Lovers...
The preceding article, in its original form, is reproduced for your aesthetic pleasure.*

如同接办留地一样当运行大程序时先读取化数据并
把大程序分解为若干分程序，每个分程序的运行中间
结果可以用命令 PUT 和 PRINT 记录下来，而在
程序结束前再读取分程序结果用 GET 或 INPUT
取出并和，经过这样两步变换也可以达到在小程序
上运行大程序的目的。

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第 页

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Cromemco Opens European Subsidiary

Anderen in April, 1981 following the Hannover Faire in Germany. After considering several alternatives, both agreed that Denmark provided an ideal location to best serve the entire European community. The site selected is in a prestigious location on the world-famous Faadhuspladsen, facing Vesterbrogade, Copenhagen's central thoroughfare.

In addition to Anderen, the office will initially be staffed by two, full-time, multi-lingual employees, including one highly trained in technical support. Further, senior members of Cromemco's Research and Development staff, as well as top technical specialists from the parent company will share their expertise with European users on rotating staffing schedules. This assures that these dealers will be provided with up-to-the-minute information on both new and existing Cromemco products.

"Simply hit the return key to proceed," Roger Melen seems to be telling Luc Holemans of Alphatronics Benelux NV, one of Cromemco's Belgium dealers, as he demonstrates the finer points of the 3102 Intelligent Terminal.

Dr. Roger Melen (second from left) and Tom McCalmont (third from left) take time out from product demonstrations to pose with (from left) Boris Krtolica, Egon Zakrajsek, Nikolau Ivancic, and Tomislav Raguz, all from AgroMarketing in Zagreb, Yugoslavia.



This type of high-level support was initiated with a two-day technical training seminar which preceded the opening of the Copenhagen office. Conducted by Dr. Melen and R&D staffers Terwilliger, McCalmont and Hall, it attracted more than 65 people from throughout the European continent.

Cromemco A/S features a permanent display of all Cromemco products. In addition, advance information on new products and new releases of existing products will be available on a consistent basis.

Dr. Melen commented that Cromemco sees this move as a first step in its plans to provide a higher degree of support for its overseas marketplaces. "It is hoped," Melen added, "that this type of Friday night gathering will be repeated in many more parts of the world."



Service Relief for U.S. Users

Cromemco, Inc. and TRW have reached agreement on the concept of having the latter company provide service contracts for Cromemco users. This will provide welcome relief for hundreds of users who are in suburban and even remote areas, far from full-service Cromemco dealers.

The service is anticipated to become operational beginning in the Spring of 1982 in certain regions of the U.S., and expand throughout the year—into 1983—until the entire nation has access to the program.

The delays in full implementation are caused by the high degree of training necessary for TRW personnel to become familiar with all aspects of the various Cromemco systems. The first wave of TRW technicians is undergoing training now at Cromemco's corporate headquarters.

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Agreement Reached on Service Center in China

A mutual cooperation agreement was recently executed between Cromemco and the China National Instruments Import & Export Corporation. The agreement calls for the mutual establishment of a service center in Beijing, The People's Republic of China, with additional centers to be established in other cities as demands dictate.

The center will provide training and support in both hardware and software, and is the first such high-tech arrangement made between China and a western company.



"Only a front page headline and story will do!" Cromemco's Alice Ahlgren and Lars Anderen discuss Europe's popular publication, DATA-NYTT, with its editor.



Italian representation at Cromemco A/S's gala opening included Mr. Preti, Mr. Crespi and Mr. Madera, all from Melchioni Computertime in Italy. Cromemco co-founder Dr. Roger Melen, welcomes them to good times and a high technology seminar.



Lars Anderen, Cromemco's European Support Manager, and Cromemco Director of Finance, Mike Ramelot receive Bit Pad briefing from Dr. Roger Melen.



Cromemco celebration gatherings are more than just computer talk and demonstrations, as is reflected by Valter Wilbert of Sweden's Datorisering Konsult AB and Lars Anderen, Cromemco's European Support Manager.

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Roger Melen and Ian Dunkley of Datron Micro Centre, England, holding a conversation on the economic effects Cromemco A/S will have on the technological community in Europe.

System Three Provides Efficiency, Versatility in Medical Lab

By Dr. M.R. Miller

Procedures for assessing respiratory function have become accepted practice in many hospitals. These procedures involve the measurement and recording of variables such as gas flow, volume, pressure and concentration. Many of these measurements lend themselves to computer techniques.

However, the present trend has been to develop separate dedicated microprocessor systems to perform specific measurements only, for instance a system to measure flow and volumes only. This approach lacks the flexibility required in a research environment so we decided to develop a system based on a general purpose computing system.

We required that our new system would accept our existing hardware (incremental XY plotter, Perex Perifile recorder, etc.), and that all equipment and peripherals could be permanently linked to the system so that a research procedure could follow routine work without altering the hardware configuration. We found that a Cromemco System Three (64K RAM) best suited our requirements for both hardware and software and we have used one with additional Tuart and 8PIO boards as the basis of our laboratory system (Fig. 1).

Some of our measurements require 12 bit scale and precision so we interfaced a 16 channel 12 bit A/D converter module (Analog Devices type DAS 1128) using a wire wrap board. Each of the 16 channels was preceded by a variable gain pre-amplifier which allows matching the outputs of the various measuring devices. This A/D converter allows

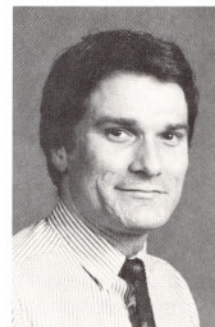
sampling of any combination of 16 dedicated input channels at up to 1000 Hz sampling frequency. We also interfaced a 2 channel 12 bit D/A converter (Data translator type DT 212) through the 8PIO board so we can have analog output as well as point mode CRT display. Software control of our experimental apparatus (e.g. solenoid valves, trigger switches, etc.) is afforded by a digital controller wired through the 8PIO board.

For graphical output we use a Tektronic T4010 graphic terminal and an incremental XY plotter both wired through the Tuart board. Some of the more complex calculations envisaged for our research are beyond the capability of a microcomputer. This problem was overcome by interfacing the System Three with one of our University of Birmingham larger computer (DEC 20/60) through a Tuart serial port using an assembler X-on X-off protocol. This not only allows rapid transfer of data to the larger computer for further analysis but also programs can be run interactively between the two computers.

Many of our procedures (spirometry, flow volume curves, whole body plethysmography) require recording at 250 Hz during a single expiration and the System Three has adequate core space to hold this data prior to computing the results. However, experiments recording over many breaths require on-line storage of quantities of data too large for the available memory space. To overcome this we have interfaced our Perex Perifile cartridge magnetic tape system (3M - DC 300A

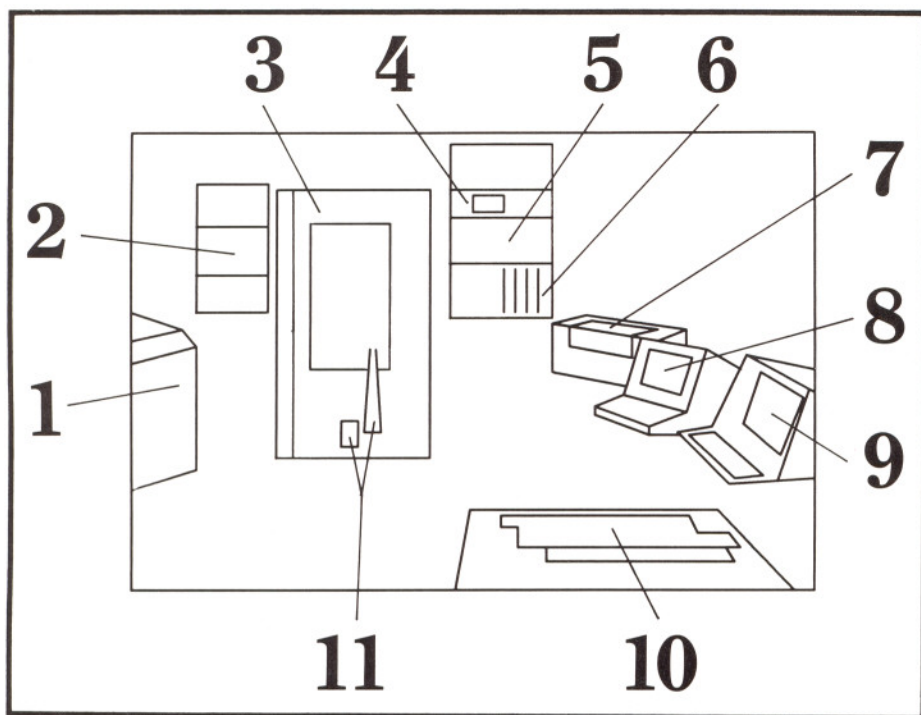
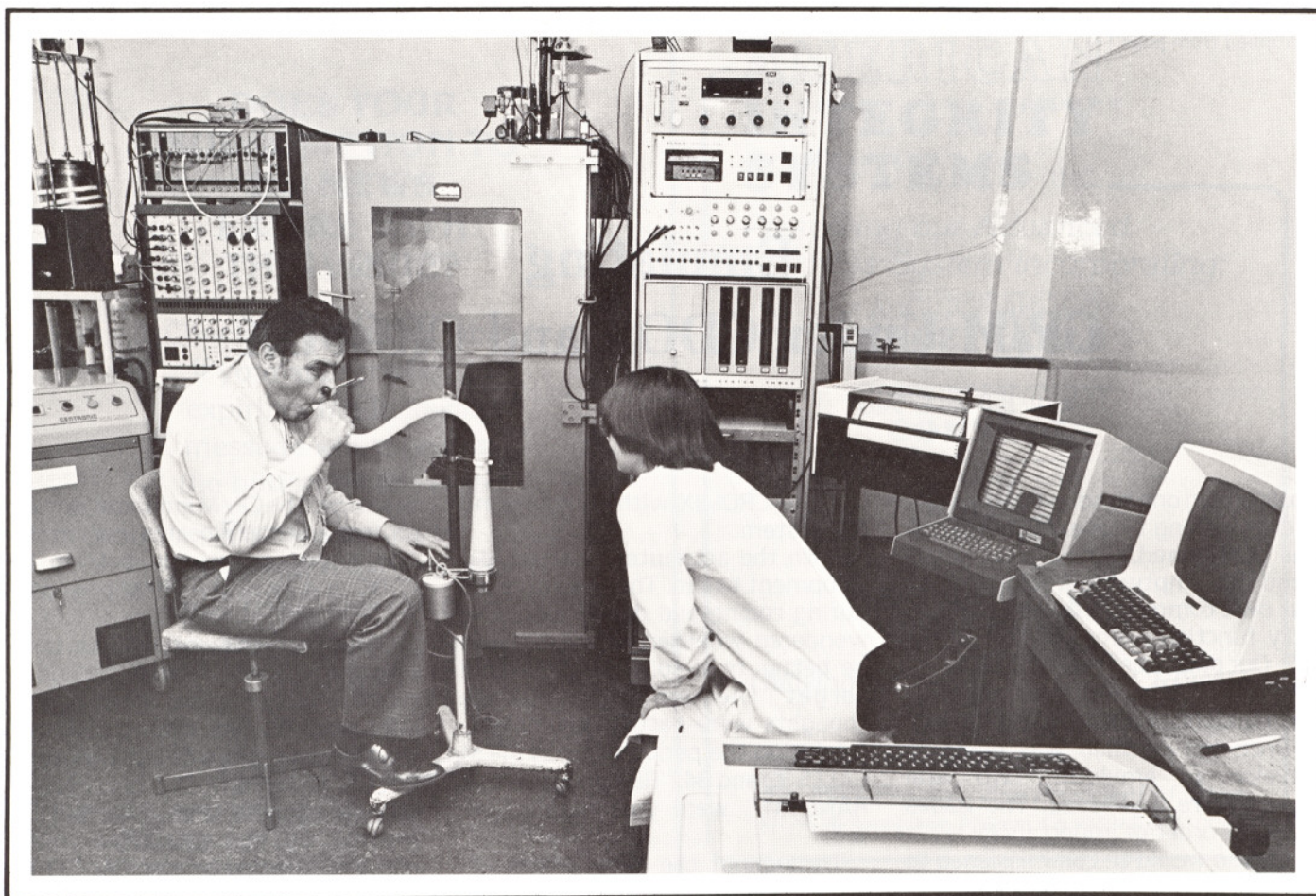
cartridge) through the 8PIO board. This device is double buffered and can accept the data continuously. At the termination of the experiment the data can be rapidly returned to memory in blocks convenient for computation.

We have found the flexibility of the System Three has made our laboratory more versatile. We can now make more efficient use of the laboratory with consequent increased turnover of work and reduced maintenance costs.



About the Author

Martin Miller studied at St. Bartholomew's Hospital, London and obtained a first class honors degree in Pharmacology in 1972 and graduated in Medicine in 1975. He joined the University of Birmingham Department of Medicine in 1979 and his current research in respiratory medicine includes the application of mathematical models to describe forced expiration and the assessment of mountaineers for their susceptibility to mountain sickness.



KEY TO DIAGRAM

- 1 Mass spectrometer
- 2 Multi channel recorder
- 3 Whole body plethysmograph
- 4 Perex perifle recorder
- 5 Pre-amplifiers
- 6 Cromemco system three
- 7 Incremental XY plotter
- 8 Tektronix T4010
- 9 VDU
- 10 Teletype
- 11 Pneumotachograph with transducer

Emulating CP/M Under CDOS and CROMIX

position. On one hand, we had valued clients looking to us expectantly; on the other hand, — well, the other hand was empty. We were forced by our own commitments to develop a fully functional emulator for CP/M 2.2. Our only other choice was to rescind our promise and lose credibility—an unpalatable alternative.

Once the decision was made to develop an emulator, two vital issues were addressed. The issues were (in order of importance):

- a) Who would be commissioned to develop the emulator? And,
- b) What form would the emulator take?

Fortunately, our headquarters are located in a high technology strip on Florida's East coast, where talented computer-minded individuals are not too difficult to find. We even found, in Chuck Brossier, a man who was both a talented systems analyst and intimately familiar with CP/M drivers. After Chuck accepted the commission to develop the software, we determined the parameters to which the emulator should adhere.

The primary requirements for the emulator were:

- 1) It should fully emulate CP/M 2.2.
- 2) It should fully support PASCAL/M, CBASIC version 2.37, CALCSTAR, MILESTONE version 1.08, and other CP/M software.
- 3) It must automatically locate itself under any size CDOS, and must remain in RAM until specifically deleted.
- 4) It must automatically load with the CDOS simulator under CROMIX.
- 5) It must prompt and respond to commands as if CP/M were in use.
- 6) It must allow for a return to

CDOS or CROMIX without rebooting the system.

With the attributes selected, development began. There were times during coding and debug when we wondered whether or not it would be better to simply use CP/M and forget the emulator. Those thoughts were particularly delightful during the period while SYSTEM CALLS 33 and 34, "READ AND WRITE RANDOM," were being implemented.

Throughout the development effort, pressure was mounting from our clients to produce CP/M software support under Cromemco operating systems.

As with most software development efforts that we have undertaken in the last eighteen or so years, there came a point at which the project took a quantum leap forward. Ours came in mid-December of last year, and the job was completed on schedule—ready for the new year.

We met our primary objective—to develop a fully functional CP/M emulator. We could now support virtually all CP/M compatible software on Cromemco hardware and with Cromemco operating systems.

Our original objectives, to fully support MILESTONE ver. 1.08 and CALSTAR, have been met. We have checked and doublechecked the emulator with other CP/M compatible software and have found that all function as if they were running under CP/M. Examples are: PASCAL/M, CBASIC ver. 2.37, Microsoft BASIC, ASM, and other systems software.

To invoke the emulator in CDOS, simply type the COMmanD EMCPM (followed by a carriage return). In

response, the CP/M emulator is loaded. It dynamically locates itself in the 1K directly below the bottom of CDOS, and gives the CP/M prompt: A

CP/M compatible software is then executed in the normal fashion—that is, by typing the name of the COMmanD file. For example, to run the Pascal program CALCSTAR, type CALCSTAR (return)

Several seconds later, you will be greeted by the CALCSTAR main menu. Operation of the CALCSTAR selections is just as if CP/M were the operating system.

When the user is ready to return to the Cromemco CDOS operating system, he executes the COMmanD file UNEM.COM by typing:

UNEM (return)

The emulator is unloaded and the CDOS prompt is once again displayed. CROMIX operation is somewhat similar, with instructions for appending the emulator to the CDOS simulator of CROMIX.

(The CP/M emulator described in this article is commercially available from Royal Data as advertised in this issue of I/O NEWS.)

About the Author

Jency Kelly is the president of Royal Data, Inc., a full service Cromemco dealership located in Titusville, Florida. In addition to the CP/M emulator described in the preceding article, Kelly has developed—with the help of his wife, Jean—several other software packages. These include a sophisticated Bill of Materials and a Manufacturing Inventory Control. Jency and Jean who, by the way, works alongside her husband as his office manager, live so close to Cape Canaveral that they need earplugs and vibration dampers each time a rocket is lifted into space!

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Cromemco's New SpellMaster Proofreading Program

By Lisa Noah

Cromemco has just released an exciting new addition to its Master software series. The SpellMaster program, a fast and efficient interactive spelling program, is designed to detect those hard-to-find errors during a quick session at the keyboard.

Proofreading and editing text for spelling errors can be a painstaking and tedious chore, especially when perfection is a must. But the SpellMaster program takes away the tedium and allows you to proof each word quickly and accurately.

We use the SpellMaster program

constantly in the Tech Pubs department at Cromemco, where we edit volumes of material. We **depend** on its speed and accuracy. Every document and manual that is produced in our department is run through the SpellMaster program before final printing (both Screen and WriteMaster files.) It only takes a few minutes and saves us a lot of time and embarrassment in the long run. You, too, can take advantage of the many special features the SpellMaster program has to offer.

Features

The SpellMaster program rises

above other spelling programs that only list or display the misspelled words; it both displays the questionable words **in context** and allows you to edit within the context. The program also finds occurrences of repeated words (such as **the the**) and allows you to accept, delete, or edit the repeated sequence. This is a marvelously helpful feature, since repeated words are so hard to detect.

The SpellMaster program is both quick and thorough; it can proof a 10,000 word document in just one

Continued on next page



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minute. Each word is checked in sequence against a 17,000 word internal dictionary that contains the most common English words, and then checked against the 100,000 word master dictionary for words not found in the internal dictionary. The program never invents words by appending prefixes and suffixes to root words. This eliminates the creation of words such as **terminaling** and **quicked**. The SpellMaster program even checks the possessive forms of words. Words can be added to the internal dictionary, allowing the user to expand and personalize it.

One unique SpellMaster feature is the guess proofing option. The program provides you with a logical guess as to what the incorrect word might be and will even make further guesses if asked. If the word **command** is encountered, for instance, the first guess would be **command**. Further guesses would be **common** and **commas**.

The SpellMaster program is simple and easy to use and doesn't require any technical expertise. All commands are executed with a single

keystroke, and an online menu displays all available options in each command mode. Default commands are displayed in brackets at the end of the menu line and can be implemented by simply pressing the RETURN key.

You can receive help from the SpellMaster program in each menu mode. The Help facility displays a brief description of each of the commands in the current menu and can also display a diagram of SpellMaster's command tree structure.

Using SpellMaster

When the SpellMaster program finds a misspelled or questionable word, it displays the word in context on the terminal screen and usually makes a logical guess as to what the correct spelling is.

You can accept the word as it is for the dictionary, for the file, or for just that particular occurrence. Accepting a word for the dictionary adds it to the dictionary, and accepting a word for the file accepts that spelling for all occurrences of the particular word in that file.

You can also edit the word and the text surrounding it, mark the word

with a special character, or replace the word with another word. Any time words are altered or inserted, the program checks them again for accuracy.

You can also automatically replace all occurrences of an incorrect word. This option is a real timesaver! A user, for example, might always transpose the letters **e** and **i** when typing the word **receive**. The word **recieve** can be corrected once and accepted for the file. The program would then automatically correct all occurrences of **recieve**, pausing briefly at each occurrence to inform the user of the correction.

We use this replace option quite often in our department. Before publication, the word **auxiliary** had been incorrectly spelled **auxilliary** throughout the Cromemco 3102 user's manual. The Replace option allowed us to quickly replace all occurrences of the misspelled word.

The SpellMaster Dictionaries

The SpellMaster program uses three different sources when checking a word: a 100,000 word master dictionary, a 17,000 word internal

Continued on next page

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Cromemco's New SpellMaster Proofreading Program

dictionary, and a 250 word cache. The internal dictionary resides in memory and is a subset of the master dictionary. The internal dictionary can proof an amazing 1,000 words per second. It is always checked first and contains the most commonly used English words. After repeated use, words in the internal dictionary are replaced by those words that are peculiar to the user's vocabulary, such as medical, technical, or legal terms. Cromemco, Cromix, WriteMaster, and SpellMaster are a few of the specialized words in our dictionary. The internal dictionary can also adapt to cultural spelling differences. This allows users in England, for example, to incorporate words such as **colour** and **analyse** into their dictionaries.

The cache contains approximately 250 words and misspelling/correction relationships. The cache resides in memory; when it becomes full its contents are merged with the internal dictionary.

The master dictionary resides on the disk and contains more than 100,000 actual words; this is about the same size as a standard desk dictionary. All but the most obscure words can be found in this dictionary. If a questionable word is not found in the internal dictionary or the cache, then the master dictionary is searched.

Directed Searches

You'll no longer need your desk dictionary since you can look up words in the SpellMaster dictionaries just as you can in a printed dictionary. The program allows you to search the SpellMaster dictionaries for the correct spelling of words by entering a replacement word which may contain one or more ambiguous characters.

When making a directed search, the question mark (?) indicates that the character position contains an unknown character. If a user is unsure whether the word **dependent** is spelled **dependant** or **dependent**, for instance, the replacement word **depend?nt** could be entered. The pro-

gram would then search its dictionaries for the correct spelling.

The asterisk (*) indicates that the character position may or may not contain a character. If a user is unsure if the word **occurrence** has one or two r's, the replacement word **oc-cur*ence** could be entered. This tells the program that there may or may not be a character located in place of the asterisk. The program would then search its dictionaries for the correct spelling.

With its extensive dictionaries, numerous options, and simple commands, the Cromemco interactive spelling program will save users both time and energy. We have found that the SpellMaster program replaces long hours of proofreading with swift single sessions at the keyboard.

The SpellMaster program is available from your Cromemco dealer on 5 or 8 inch floppy diskettes for \$295 (U.S.) This versatile program can be used with the Cromemco Screen editor and the Cromemco WriteMaster word processing system as well as with Wordstar.



About the Author

Lisa Noah is an editor in the Technical Publications department at Cromemco. She is a recent journalism graduate from San Jose State University and previously worked as a writer in the publications department at West Valley College.

The COBOL Corner

The foremost consideration in writing any program must always be to bring about a correct result via proper file and data definition and appropriate procedural logic. The very richness of the COBOL language usually allows for this accomplishment in a variety of ways.

While a secondary consideration, it is nevertheless very important, for an author to write not only correct programs but ones that operate efficiently. This includes interactive programs that do not hold back the operator (particularly under multi-user CROMIX) and batch programs that do not require excessive run time.

Achieving run time efficiency in a COBOL program depends considerably on the specific coding techniques employed. While the COBOL manual sets forth reasonably well the components of the language it gives very little advice on achieving coding efficiency.

As an example let's consider the common problem of testing a multi-value condition:

UM, the unit of measure field, used in an inventory application might have 12 values e.g. —

EA = EACH, LB = POUND,

GL = GALLON, FT = FOOT

Validating this code might be accomplished by an equals test for each value or by setting up a multi-value 88 condition name for testing, both as shown below:

IF UM = "EA" OR "LB" OR "FT"
or

IF VALID — UM ... with condition name in Data Division —

88 VALID — UM VALUE "EA",
"LB", "FT".

The multi-value condition name method is dramatically more efficient. Placement of the most common values at the front of the list also helps efficiency.

Looking up items in tables held in memory is another task frequently needed. COBOL provides a SEARCH verb to find entries by key in either sequenced or random tables. For sequenced table searching a user written binary search method will significantly outperform the SEARCH ALL statement. In the following ex-

ample of a binary search of an ascending sequenced table the written routine ran about 25 times faster than a comparable SEARCH ALL sentence.

In the DATA DIVISION:

```
01 TABLE-OF-ARGUMENTS.  
   05 ARGUMENT OCCURS 384 TIMES INDEXED BY ARGUMENT-INDEX  
                                           PIC X(08).  
  
01 TABLE-OF-INCREMENTS COMP.  
   05 INCREMENT-TABLE  
       10 FILLER PIC S9(04) VALUE +064.  
       10 FILLER PIC S9(04) VALUE +032.  
       10 FILLER PIC S9(04) VALUE +016.  
       10 FILLER PIC S9(04) VALUE +008.  
       10 FILLER PIC S9(04) VALUE +004.  
       10 FILLER PIC S9(04) VALUE +002.  
       10 FILLER PIC S9(04) VALUE +001.  
       10 FILLER PIC S9(04) VALUE +000.  
   05 INCREMENT-ITEM REDEFINES INCREMENT TABLE OCCURS  
       8 TIMES INDEXED BY INCREMENT-INDEX  
                                           PIC SP(04).  
01 INCREMENT PIC S9(04) COMP.  
01 LOOKUP-KEY PIC X(08).
```

In the PROCEDURE DIVISION:

SEARCH-ROUTINE

SET ARGUMENT-INDEX TO 256.

SET INCREMENT-INDEX TO 1.

MOVE 128 TO INCREMENT

PERFORM SEARCH-TABLE 9 TIMES.

IF LOOKUP-KEY GREATER THAN ARGUMENT (ARGUMENT-INDEX)

SET ARGUMENT-INDEX BY 1.

IF LOOKUP-KEY = ARGUMENT (ARGUMENT-INDEX) ...

SEARCH-TABLE

IF LOOKUP-KEY GREATER THAN ARGUMENT (ARGUMENT-INDEX)

SET ARGUMENT-INDEX UP BY INCREMENT

ELSE

SET ARGUMENT-INDEX DOWN BY INCREMENT.

MOVE INCREMENT-ITEM (INCREMENT-INDEX) TO INCREMENT.

SET INCREMENT-INDEX UP BY 1.

At conclusion of the routine ARGUMENT-INDEX points to the found ARGUMENT or when not found points to the record with the next higher key.

The use of INCREMENT-TABLE to obtain successive lower binary powers was chosen because the overall search routine performance is improved substantially by avoiding DIVIDE by 2 or MULTIPLY by 0.5.

Table sizes for binary search are best when they are equal to a binary power or the sum of consecutive binary powers. The binary

powers are 1, 2, 4, 8, 16, 32, 64, 128, 256, etc. The example routine used a table of 384 (128 + 256). Unused record positions at the rear of the table must be set to a high value to avoid incorrect results. The last table record must always contain a high value.

NEXT ISSUE — Observations on Cromemco's new edition of COBOL version 4. 6.

Programs for Production Planning & Control on Microcomputers

By Andy Makeham

As a result of consultancy work undertaken for the government of the United Kingdom, Sheffield Micro Information Systems, Ltd. has developed and installed a comprehensive range of production and management software systems.

The development was the result of analyzing production problems within some 40 manufacturing companies varying in size and manufacturing methods.

Some of the production planning and control problems were encountered in the following areas, all of which demand the specific explanations which accompany them:

1) In the area of JOB COSTING AND CONTROL OF WORK-IN-PROGRESS, each job was different and the task of tracking each job by material/components, labor, sub-contractors, and overhead was not being met. Often, the lack of accurate data for individual jobs resulted in cost overruns in both time and materials. Also, the lack of definitive information by types of jobs meant that estimating on future jobs continued to be inaccurate.

2) MATERIAL REQUIREMENTS PLANNING, with accurate estimates, can allow a job to go through the production facility smoothly. What was too often encountered was the exact opposite — inaccurate estimates as to material requirements resulting either in jobs held up on the shop floor while awaiting delivery of additional parts or materials, or serious overstocking of materials which threatened a company's financial status.

3) Poor WORK-IN-PROGRESS MONITORING sometimes caused production jobs or critical sub-assemblies simply to "get lost" within a plant. Not a happy prospect — for either a manufacturer or his customer.

4) CAPACITY PLANNING is the title applied to the discipline of scheduling Work-In-Progress and future production orders. With proper data and tracking, Capacity Planning ensures an even and steady workload, and availability of production facilities as needed. Without proper data and tracking: disaster.

5) STANDARD COSTING permits the inflationary factors — both labor and materials — to be considered when estimating. It also allows profitability factors of the different products being manufactured to be monitored.

In addition to the manufacturing and production areas which were found to be sorely lacking in data flow, several general production management procedures were found to be both inadequate and uneconomical. Among them were,

- unresponsive manual systems causing paper flow which did not correspond with actual Work-In-Progress...

- high cost of manual systems — too many overpriced clerks processing too many pieces of paper, much of it so far behind as to be meaningless...

- batch computer systems — both expensive and terribly unresponsive...

- complex production management systems developed for large

mainframes proved to be far too complex and expensive for both production management and supervisory staffs.

These, then were the most common — and most wasteful — of the problems found in the companies researched, and the starting point for SMIS to create a system which would streamline production and production management.

Designing a Production Management Microsystem Structure

All members of the software development team at SMIS have worked with large mainframe production management systems. It was, therefore, with experience by which the consensus of opinion was reached: the best development strategy using a microcomputer-based system would provide basic BUILDING BLOCKS. These modules, with the flexibility to make additions for specific companies where necessary, were deemed preferable to creating a complex set of built-in options. This strategy has proven to be most effective.

The software, written in CIS COBOL, is all menu driven making it quite user-friendly. The ease with which a user can begin to learn and use the programs has made them readily accepted by production personnel. There is the added advantage of minimal installation costs, even where users have had no previous computer experience.

The following illustrates the variety of BUILDING BLOCKS, and gives examples of how they can be linked.

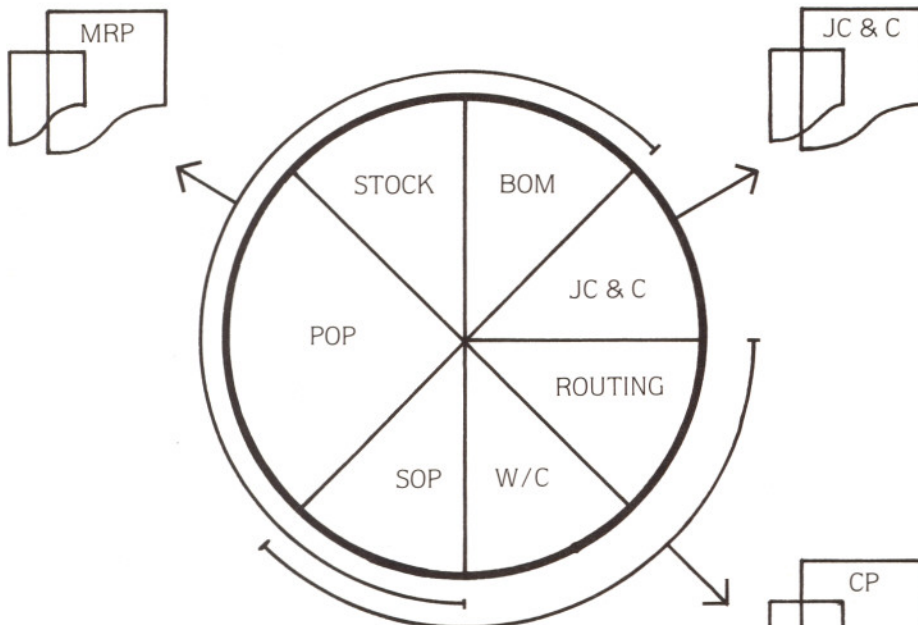
Continued on next page

Production Management Microsystem Structure

The software development staff at SMIS have all worked with large mainframe production management systems. We felt that the best development strategy with micro-computer based systems would be to provide BASIC BUILDING BLOCKS and make additions for specific companies where necessary rather than to offer a complex set of options to users. This strategy has undoubtedly PROVEN TO BE RIGHT.

The software (written in CIS COBOL) is all menu driven and users quickly learn to use the systems thus making them READILY ACCEPTED by production personnel and minimizes installation costs even with personnel with no previous computer experience.

The variety of building blocks (with an illustrative way of linking them) are:



Key to Modules

Routing — Work/Materials Flow Charting
BOM — Bill of Materials with Standard Costing
JC & C — Job Costing & Control of Work-In-Progress
W/C — Work Center
SOP — Sales Order Processing
POP — Purchase Order Processing
CP — Capacity Planning
MRP — Material Requirements Planning

Continued
on next page

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Programs for Production Planning & Control on Microcomputers

The versatility of the Production Management System can be illustrated by some of the successful installations of the software in the following applications.

Jobbing Manufacturing Company

In a Jobbing Manufacturing Company, each job has estimates of 1) material and component costs, 2) production operations and times, and 3) sub-contractor costs entered into the system. Details of operational progress from clock cards, and costs from material and sub-contractor invoices, are fed into the system thus allowing:

- the PLANNER to schedule production and determine operational work loads...

- The CONTROLLER to monitor job progression in terms of operations, delivery times and costs...

- the ESTIMATOR to receive accurate information on completed jobs in order to have the data for future quotes of similar work...

- AUTOMATIC REPORTING of jobs approaching time or material cost estimates. Job profit and production performances, including employee time, can be constantly monitored.

Batch Manufacturing Company

A Batch Manufacturing Company uses a different approach than a Job Manufacturer, but the modular approach allows for this flexibility.

- Products, or quantities are fed through the BILL OF MATERIALS (BOM) module to determine the stock required...

- Additional stock requirements are determined and entered into the PURCHASE ORDER PROCESS (POP) module...

- Items in manufacture are progressed through utilization of the WORK-IN-PROGRESS (WIP) block...

- Operations and time are determined from the ROUTING module, and work loads on the different operations/departments are compared with available capacity from the WORK CENTER (W/C) block.

Control is achieved by identifying the location of any job on the shop floor with **automatic** identification of overdue operations anywhere along the route.

(EDITOR'S NOTE: The foregoing are but two of many examples of how the modular software package offered by SMIS can be utilized in manufacturing environments. Other applications, such as equipment procurement, plant hiring, and specific installation in a tannery, have all been accomplished. Details can be obtained from SMIS whose address follows this article.)

Hardware Requirements

The staff at SMIS have successfully installed several Production Control/Costing Systems on Cromemco equipment. By far, the most suitable computer in their board product offering is the Z2-H, as it affords the user sufficient hard disk capacity to sensibly implement production systems with accounts and other applications. The position of the Z2-H is further enhanced by the recent introduction of reliable tape backup devices.

Although all present applications have been made under CDOS, other operating systems compatible with CIS COBOL could be used.

Benefits Realized

Depending on the type and complexity of the installation, pay-back periods for both hardware and software costs have been approximately one-and-a-half years. Typical specific benefits have included:

- Reduction of estimator, planning, and control staffs. Production Managers who heretofore have used all their time scheduling, are now able to use the information produced by the system to concentrate on production, rather than spend their time maintaining an inadequate system...

- Improved production throughput, resulting in getting jobs efficiently completed and out the door,

thus improving cash flow...

- Identification of the real production and material costs, leading to better control over plant and office overhead — and profitability...

- More accurate estimating...

- Elimination of high computer bureau costs.

There is no doubt that the present generation of microcomputers allow greater flexibility — at less cost — than older methods of data processing. Improved productivity, efficiency and reporting lead to greater profits — and certainly justify the investment in a microcomputer-based system.



About the Author

Andy Makeham graduated in Computer Science and, after working for several companies, joined Sheffield Micro Information Systems (SMIS) Limited to organize the software development team.

The company specializes in Production Management Software Systems on microcomputers.

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Application Note:

CROMIX Command Line Use in 16K or 32K BASIC

By Norman Miller

Many users of BASIC might be interested in this programming technique which allows any CROMIX command or utility to be executed directly from within a BASIC program.*

Getting the system time and date, checking the status of processes, sending messages to other users, and changing tty modes, are just a few examples of features which can be made part of BASIC through this simple scheme.

Particularly useful is the ability to spool files to the printer, thus avoiding the ordinary inconvenience of having to save the file and exit basic to print it. This feature considerably enhances the use of BASIC for I/O in-

tensive applications.

The scheme involves patching a small assembly routine into the available space in 16K or 32K BASIC. This routine, which can then be accessed through the USR function, uses the CROMIX .fshell system call to fork a shell and execute a child process.

The power of this setup comes from the fact that only one routine needs to be written to provide the many system utilities and commands available. Only one parameter is passed into the routine, and only one is returned.

The calling parameter is simply

the address of a string variable, a string which contains a CROMIX command line. Using a string variable as the calling parameter is especially powerful, since we can not only use any variety of calls in this method, but also have the ability to store these command lines within the BASIC code, or have them entered interactively from a running program by use of an INPUT statement.

In applications software, for example, the programmer now has a very simple technique to allow or disallow user access to the operating system.

Continued on next page

```
*include jsysequ.z80
;
;               org      125h           ; put routine at 16k basic patch space
;
main:           cp        2             ; check for wrong number of args.
               jp        nz,badarg     ; return to basic, if bad.
               pop       h1            ; take string address of command
                                       ; line off the stack.
               ld        (bufadr),h1   ; place adr in arg__list
               ld        b,0           ; b and c registers set to indicate
                                       ; which signals pass to child process
               ld        de,arg__list
               jsys      .fshell        ; fork a shell and execute
               ld        c,0           ; command line in arg__list
               ld        hl,0
               jsys      .wait         ; wait till child process finished
               ret                   ; then return to basic program
;
badarg:         ld        b,a
loop:          pop       de            ; clear params off stack and return
               djnz     loop           ; to basic with dummy var. set to - 1
               ld        de, - 1
               ret
;
arg__list:      defw      arg__0
               defw      arg__1
bufadr:         defw      0
               defw      0
;
arg__0          defb      'sh',0      ; request a shell
arg__1          defb      '- c',0     ; command line is not parsed
               end        main
```

Continued on next page

The example above has been ORG'ed at 125 Hex in memory, which is within the patch space available in 16K BASIC. Note however, that the routine could just as easily be located anywhere in BASIC where the user can find room for it. Note too, that the same routine is essentially correct for 32K BASIC which also has available patch space at 125 Hex. The first line of the routine must be changed from cp 2 to cp 1, though, to account for the difference in the USR function's calling arguments in 16K and 32K BASIC.

Only one parameter is passed back to the BASIC program. If the USR function has called the routine with the wrong number of arguments, the stack is cleared off and the dummy variable which called it will be set to -1 via the de register pair. This permits a simple test to be included in the BASIC program, to guarantee correct operation.

Patching Procedure

Since this file is absolute code (non relocatable), it should be assembled with the Hex option of the Z80 macro assembler so that we can patch it in at the correct location.

From a CROMIX prompt you would type

```
%ASMB FILE1 HEX (assuming  
that you named your file FILE1)
```

Once you have successfully assembled this file you are ready to create a new version of BASIC with it. This can easily be done through use of the Cromemco Debug software. The procedure is as follows:

1) From CROMIX type

```
%DEBUG BASIC.COM
```

(or SBASIC.COM if you are going to patch 32K BASIC.)

2) Once you are given the DEBUG prompt specify the file name of the assembly routine to be patched.

```
- FFILE1.HEX
```

3) Read the file into memory (note: the ORG has already taken care of its location)

```
- R
```

4) Specify a name for your new basic command file. (note: any name will do)

```
- FCROBAS.COM
```

5) Write this new file to the disk.

```
- W
```

Once you have exited the debugger, you should check your directory and see that there is now a file CROBAS.COM. This version of BASIC is now ready to go and can be loaded by typing CROBAS from A CROMIX prompt as you would to load BASIC or SBASIC.

Use of the Routine

This new version of basic is completely identical to the version from which it was copied. The only difference now is that a USR call to location 125H (or whatever location you org'ed your routine at) will allow CROMIX operations to be performed. A simple 16K BASIC program will help show its use.

```
10 DIM A$(100)
20 PRINT"Put CROMIX command line here ==>";
30 INPUT A$
40 L=LEN(A$) : A=SYS(2)
50 X=USR(%0125%,A)
60 IF X=-1 THEN GOTO 1000
70 REM CONTINUE ON WITH PROGRAM AS NORMAL
80 STOP
90 END
1000 REM : ERROR IN USR CALL TO CROMIX
1010 PRINT"INCORRECT NUMBER OF ARGUMENTS IN CALL."
1020 STOP
1030 END
```

Instead of inputting the string A\$, we could just as easily have put the desired command inside the code. For example, if we only wanted to spool the same file each time the program is run, we could merely change lines 20 and 30 to:

```
30 A$ = "SPOOL MYFILE"
```

After playing with the more obvious abilities of this modified BASIC, the programmer will rapidly discover that powerful new features have been handed to him through this one simple routine. A little creativity and imagination will likely uncover entirely new applications to which BASIC was previously ill-suited, and yet is now quite convenient to use.

* NOTE: Changing directories is not possible. This is due to the fact that exiting from a forked shell will always return you to your original directory. Use of the CROMIX directory command will thus change the directory instantaneously, but puts you right back in your original directory when the assembly routine returns you to BASIC, effectively cancelling the directory change.

Line 40 calculates the address of the string A\$ and puts it in variable A. Note that you must pass the address of the string and not the string itself as a parameter. In a 32K Structured BASIC program the ADR function can be used to find the address of the string. Line 40 can therefore be omitted and line 50 changed to:

```
50 X = USR(%0125%,ADR(A$))
```

About the Author

Norman Miller is a valued member of the Customer Support Team at Cromemco, Inc. He was graduated from the University of Arizona in 1981 with a B.Sc. in Electrical Engineering, with a full complement of technical electives in the Computer Sciences. Mr. Miller's current areas of special interest are in Computer Graphics and Office Automation.

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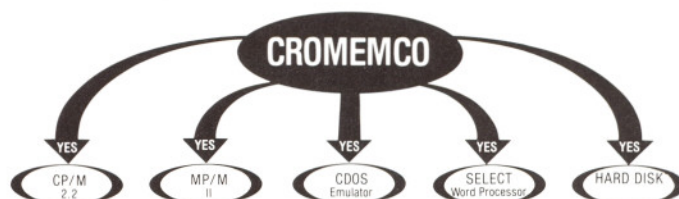
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Major Market Areas: California, France, Asia. (both sales and service)

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Ian Savicky, Tech Advisor
Norman Rosenbaum, Sales Mgr.
Mark Coulthard, Engineer

Major Market Area: Sales & Service: Throughout Australia

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Major Market Area: Sales and Service: Western Michigan
Extended Market Area: Service and Software: U.S. and Canada

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Key Personnel: Danny McNally, Director, BSC (Computer Science)
Don Lehane, Director, BSC (Computer Science)

Major Market Area:
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Major Market Area: Software — Nationwide
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G. Nielsen, Service Engineer
S. Evans, (CPA) Bus. Consultant

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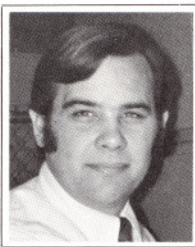
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Kevin Elmore, Programmer/analysis

Major Market Area: Sales: S.W. Kansas, extending to Colorado, Kansas, Oklahoma, Texas, New Mexico. Service: S.W. Kansas.

Continued on page 34



TEC TIPS is a regular column aimed at providing hints for keeping systems up and running. It will not attempt to deal with specific engineering applications or non-standard configurations. TEC TIPS is edited by Richard Quinn, owner of QUINTEC, a Southern California Computer service firm.

Hard Disk Notes

A couple of quick items about the hard disk system:

Hard disk capability was added to Version 2 of CDOS. However there are definite problems with the earlier versions of the operating system. Current version is 2.36. If you are using a hard disk use that version of CDOS.

As I mentioned before, do not include the WDI card in the priority interrupt chain.

Do not re-initialize the hard disk drive unless absolutely necessary. However if you do need to, for whatever reasons, be certain to use version 2.15 or higher (current version of INIT is 2.21). This is designed to best meet the needs of the hard disk drive and its alternate track table.

When using CROMIX to initialize a hard disk you must select drive E for HDO or drive F for HD1. All drives less than E are for floppies, large or small.

HDIAG will work with CROMIX or CDOS except for the A (alternate track table) command. It gives incorrect information in CROMIX and will have to be run under CDOS to be used. You can use a CDOS HDIAG on a disk initialized for CROMIX. In addition, HDIAG has to be run from the system console in a CROMIX system.

When locking the heads on a non-auto lock hard disk drive be certain that the head is all the way back before locking the screw. It may be necessary to tilt the system slightly to cause it to retract. This will keep the heads off of the recording surface so it will not bounce and chip the surface during a move. (Newer auto-locking drives do all of this automatically. Do all of this on power down.)

I mentioned before the problems associated with not letting the hard disk warm up for 20-30 minutes before use. I have installed a 7 day time clock on some systems that brings the drive on 45 minutes before the work day starts so users can login as soon as they arrive at work.

Using a 7 day clock allows the system to remain off on weekends.

If you are using a hard disk with 16KZ memory cards add a 1.5K ohm resistor from the +12 regulator output to ground. This will hold the 12 volts stable during DMA transfers to the WDI. The system may occasionally die without this modification.

DO not put revision G or E 64KZ memory cards next to the WDI card in hard disk systems. The RF radiation generated on the memory board can affect the reliability of the WDI.

Fast Copy Programs and XFER

Many are using fast copy programs that are available instead of XFER because they are much faster. The fast copy programs are fine for disks that are well organized in terms of where the data for a file resides physically on the disk. But because CDOS dynamically fills in the available disk space, an individual file may be spread over many tracks on a disk, slowing access by causing many track relocations. Fast copy programs duplicate disks track for track, byte for byte. Using XFER will pack a file so that all data for a particular file is sequentially located on the disk, cutting down track to track movement.

Office Static Control

Many things are sold to cut static in the office, especially for certain carpets. The two best solutions I have found are to be certain that the system is well grounded (i.e. the third prong on the power plug of all equipment to a good earth ground through its outlet) and the use of a good grade fabric softener on the carpet. Most softeners have anti-static compounds in them and work well if applied with a spray bottle on the affected areas. Be certain to spray from wall to wall for good grounding. The spray is much cheaper than what you will buy as anti-static compounds and is often

the same thing. Controlling static through good grounding and spraying will prevent damage to fragile low power integrated circuits.

Loose Chips

Cromemco has, at long last, gone to a stronger holding socket for all ICs. But older boards had a problem with ICs that "walk" out of their sockets. Remove these boards and re-seat all ICs by pressing them into their sockets with your thumb. This was a particularly common problem with the older 64KZ boards under the large heat sink. The chips move from the heating and cooling of the system as it is turned on and off.

STAT — Label Feature

On the newest version of STAT (version 2.16) you can relabel a disk without affecting the directory. In older versions it would wipe out the directory as the label was the first directory entry if used. If you do not label a disk when initializing, it can be added later provided the sidedness (double or single) and the number of directory entries is not changed. (We only know of the last two items by trying them.) All double-sided, double-density diskettes must be labeled using STAT/L to work correctly.

Fast Memory Chips

Cromemco uses only fast (150 n.s.) memory chips in all their boards. While a board may work fine in many programs with slower memory chips, there can be a problem of lost data in faster DMA transfers especially with hard disk systems or SDI systems. For best reliability be certain that your service center is using 150 n.s. chips.

Ground Fault Problems

I have dealt with many systems that were damaged or unreliable as a result of ground faults. High current and high voltage shorts can oc-

Continued on next page

cur that will often blow the RS232 driver chips in terminals, floppy disk controllers or TU—ARTs. Often the problems come from add-on floppy disk drives or terminals other than Cromemco. (I have even had the problem with a few Cromemco terminals.) Many printers will likewise cause problems. The problems have been most apparent in CROMIX systems where various terminals are in different locations using different outlets. The ground faults are often caused by improperly wired outlets (there are many out there) or bad extension cords. It is difficult to describe in a short form all that is entailed in eliminating such faults. Anyone needing this information can write and enclose a self-addressed envelope for a bulletin on the topic. (Send inquiries to Tec Tips, c/o I/O News.)

PRI Revision B

If you lose characters using a PRI revision B then change IC 1, 2 and 3 from 74LS373 to 74S373 to improve timing and data transfers. It's a minor change but it will help a lot of phantoms.

3355 Spinwriter Driver

Cromemco informs me that there have been bugs in the earlier versions of the 3355 printer driver routine. Use version 2.06 for best results. If you need an upgrade, call Customer Support at Cromemco and give the serial number of your driver for a new version.

Oscillators on TU-ARTS

Use only Texas Instruments SN74LS04's on TU-ARTs for replacement. Other manufacturer's chips have been found to cause problems when used in this particular circuit. The T.I. chips break into oscillation naturally and as designed while other chips have had trouble in starting oscillation.

Continued on page 33

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PlanMaster Released

PlanMaster, a Visicalc-like financial planning and budgeting software package, was released by Cromemco in December, 1981. While similar to Visicalc in concept, PlanMaster is described as more powerful and easier to use. We know that many members of IACU have been waiting for this package for a long time, and we would like to congratulate Cromemco for making PlanMaster available at a very competitive price. (Suggested list: \$295)

CDOS Tutor Needed

Barry Libowicz of New York City would like someone in his area to spend a day or two teaching him all about CDOS, including System Calls. He is willing to pay to be tutored, and promises to learn fast. If you qualify, call Barry at: (212) 564-1335.

Texas Users' Group Forming

Cromemco users in Texas will soon be able to benefit from other users around the state. Anyone interested in exchanging ideas and learning experiences with others can contact Rand Byron at 2129 Westheimer, Houston, TX 77098. Please include telephone number, application interests, and company name.

Cromemcohorts Building Library

Cromemcohorts, the West Los Angeles Users' Group has been actively building a software library, mainly of programs and utilities put together by its members. At latest count there were some 40 items in the library, and about 30 members. Anyone wishing to affiliate with this group, or wanting to demonstrate either software or hardware devices, can contact the group's secretary, Rich Sloan, at (213) 533-4271 (wk.), or (213) 320-4160 (hm.).

The latest meeting featured a demonstration of the Quintec

Drive-Saver, a software controlled device that provides automatic motor shut-off for Persci 299 drives. Richard Quinn installed the device on a member's system in about 10 minutes, then showed how it can be used to save unnecessary wear and tear on drives and heads. The group meets monthly.

Software Search

Don Geisel of Testamatic Corp. in Troy, New York is looking for a Realtime Debugger for FORTRAN. He can be reached at (512) 272-0292. We would also like to know about such a package, so that we can keep the information on file for future reference.

Cromemco Dealers' Association Being Formed

In order to provide Cromemco users with more uniform service and support throughout the United States, Cromemco dealers are holding the inaugural meeting of the Cromemco Dealers' Association in June, 1982. The meeting is to be held during the National Computer Conference (NCC) in Houston, Texas. All Cromemco dealers and OEMs are invited to participate. There is no charge for joining the association. For more information, write: Ms. Cindy Tanner, 5401 Mitchelldale, Suite A3, Houston, TX 77092, or you may call her at (713) 527-8008.

SUDS for COBOL Users

If you are an avid COBOL user, subscribe to SUDS now. Cromemco has just released a new version of its COBOL which offers some welcome features. Compiled code is more compact, ISAM routines are faster, and the new version is GSA Validated. We hope to have a review of the new version in next issue's COBOL CORNER.

CPMSIM Update

George Cowsar, author of the article 'CPMSIM A CP/M Operating System Simulator' (I/O News, Vol. II, No. 1), sent us a note as a follow-up to the article. He writes:

"...we have now implemented the WRITE RANDOM WITH ZERO FILL SYSTEM CALL. Also, for those many people who have asked, SUPERCALC will definitely run under CPMSIM Version 2.07. We will have available, in January, a special version of CPMSIM which allows implementation of the function keys on the Cromemco 3102, Beehive DM5 CRT, and IBM 3101 CRT. Updates on CPMSIM are available upon request for \$30.00 plus shipping charges."

Membership Numbers on Mailing Labels

As the result of an excellent suggestion from a member, we are putting Membership Numbers on the mailing labels. Many Members have indicated that they have either lost, or misplaced their cards, and do not have a record of their numbers. Check your label when you receive your copy of I/O News. The number is opposite your name. Meanwhile, we are making arrangements with a new vendor to be able to make duplicate cards. These should be available this Spring.

Statistical Package in Demand

More users have written to ask for help in finding a statistical analysis package. We asked for assistance on this a couple of issues ago, but no replies have come in so far. If you have any leads as to where we can find such a package, please pass them on to us — we will follow through immediately.

Omission Noted

Antoine Dahdah of Caracas, Venezuela sent us a nice Christmas

Continued on next page

card, and also a note correctly pointing out that we mentioned the price of the new System One (\$3,995) in the last issue, but failed to mention the price for the System One-H. The suggested list price for the One-H is \$6,995. Also, the 5" hard disk used in the One-H will soon be available in kit form as a retrofit to existing Systems Two and Three. The price of this package, including cables, brackets, screws, and what have you, is expected to be about \$3,500.

Printer Conflicts under CROMIX Resolved

David Samuels of Select Systems in England seems to have solved some of the problems encountered by using different printers under the CROMIX operating system. He writes:

"I read with interest the article by J. Siedband, 'A Spooling Program for 32K Structured BASIC' in the Sept./Oct. issue...We, too, experienced a problem...and have developed three different approaches which may interest your readers.

Approach 1

We have developed an additional Structured BASIC driver which we call "\$FX" (for Fork & Execute) which treats the problem in a similar fashion to J. Siedband's approach and requires an additional 64K of memory. All we do is to open a channel to the driver, pass the parameters via the print statement, and close.

Approach 2

A simpler approach: Create a print file of length 131 characters, open it and output to it as if it were "\$LP", closing it when finished. When the application is complete, spool the print file.

Approach 3

The most elegant approach (we feel): Use DEBUG to patch the simulator SIM.BIN at address 7b1, changing "/dev/Prt" to "printout". As SBASIC.COM runs under the simulator, any standard printed output will now be appended to a disk file "PRINT-OUT", which may be spooled at the end of the application. This approach has the added advantage of working for **any** language using

symbolic assignment for the printer (e.g. BASIC80's LPRINT and LLIST commands).

If any reader is interested, we can supply copies of SBASIC10.SBR incorporating the "\$FX" driver at \$200 per copy, on receipt of copies of the software licenses for Structured BASIC and CROMIX (applicants will need their own Structured BASIC generator package). Also included is our Resource Protection Driver "\$RP" which provides record or file protection using CROMIX 11.03 .LOCK and .UNLOCK calls."

Anyone interested in taking advantage of David's offer can contact him at: Select Systems, OSL House, Broxbourne, Hertfordshire, EN10 7JD, England.

Search for Surveying Software

The Tehama County (California) Road Department is looking for a surveying package, preferably written in 32K Structured BASIC, or FORTRAN. The package should be user friendly, and comparable to COGO (which was written in North Star BASIC, therefore not transportable). If you know of such a package, please contact Rose Lane, Associate Civil Engineer, Tehama County Road Dept., 9280 San Benito Avenue, Gerber, CA 96035. Or, phone: (916) 385-1462.

Continued from page 31

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Cleaning Edge Connectors

If you have a system that lacks reliability it may be due to dirty edge connectors. Cromemco has gone to a high pressure connector on newer systems which helps. But, many older systems had problems dying that can be traced to the connectors on the cards. The 100 (S-100) connectors on each card are gold plated and can be cleaned using trichloroethane. This is commonly

sold as contact cleaner. DO NOT use any that have any kind of silicon or oils. After you have cleaned the connector with the solvent using a clean white rag, wipe it dry—do not allow to evaporate dry. Some have used a pink pencil eraser which works well but can eventually remove the gold plating. Then you will really have problems! In a pinch use denatured alcohol, but again be certain it does not contain oils as rubbing alcohol does. For best results use the trichloroethane.

J. Peckler, (CPA) Bus. Consultant
L. Terry, Acctg. Sys. Consultant
L. Yori, (BSEE) Mgr. Reno Office
M. Nadaire, (MSEE) Mgr. Paris Office

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Service: S.F. Peninsula & Nevada extending into N. California

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Mark Clough, Sales Engineer
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Major Market Area: Southeast Florida

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Gerardo Elizondo, Technical Mgr. (MSEE)

Major Market Area:

Sales & Service: Internationally, primarily Mexico

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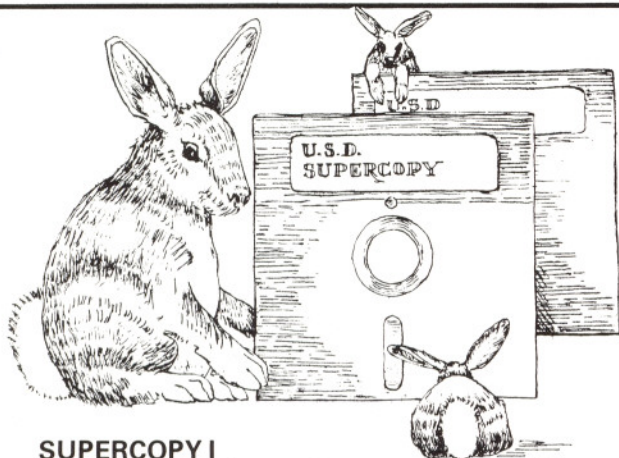
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Inventories complete line of Cromemco hardware and software in Italy, with a market extending into Greece. A four-year-old distributor firm, Unicom offers sales and support of the full Cromemco line for business, scientific and industrial applications.

Key Personnel: P. DiCamillo, Managing Director
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F. Montanari, Systems Manager
A. Capocchi, Service Manager

Major Market Areas: Italy; Greece



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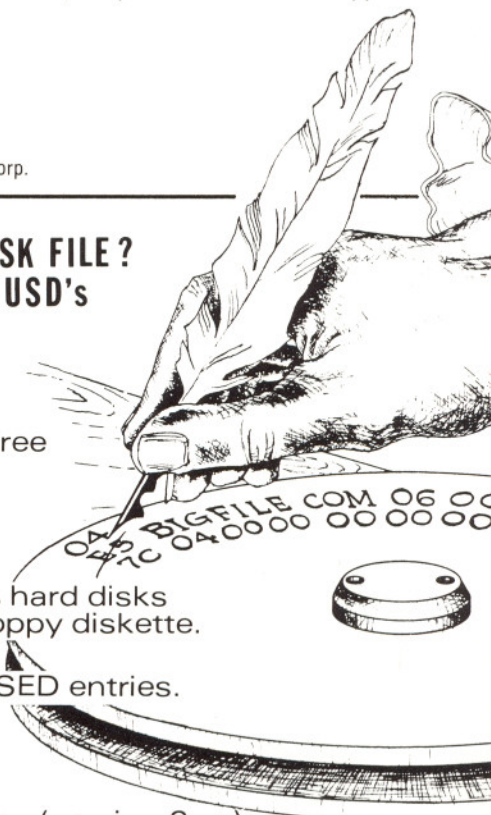
Restore.Com restores erased files on Cromemco's hard disks (HDD-11, HDD-22, Z2-H, etc.) or any Cromemco floppy diskette.

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As you can see, the new One offers you a lot of performance. It's obviously designed with anti-obsolescence in mind.

What's more, it's priced at only \$3,995. That's considerably less than many machines with much less capability. And it's not that much more than many machines that have little or nothing in the way of expandability.

Physically, the One is small — 7" high. And it's all-metal in construction. It's only 14 1/8" wide, ideal for desk top use. A rack mount option is also available.

CONTACT YOUR REP NOW

Get all the details on this important building-block computer. Get in touch with your Cromemco rep now. He'll show you how the new System One can grow with your task.

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